

Amendments to the Claims

This listing of claims replaces all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently Amended) Electronic equipment comprising:

a substrate having an insulating surface;

a semiconductor layer formed over the substrate ~~on an insulating surface~~, said semiconductor layer having a channel forming region, an LDD region and source and drain regions;

a gate insulating film formed over said semiconductor layer;

a first gate electrode comprising a first conductive film formed over said gate insulating film;

a second gate electrode comprising a second conductive film formed over said first gate electrode;

wherein the width of said first conductive film in the longitudinal direction of said channel forming region is larger than that of said second conductive film;

wherein said LDD region entirely overlaps with said first conductive film with said gate insulating film interposed therebetween and contacts said source and drain regions.

2. (Currently Amended) Electronic equipment comprising:

a substrate having an insulating surface;

a semiconductor layer formed over the substrate ~~on an insulating surface~~, said semiconductor layer having a channel forming region, an LDD region and source and drain regions;

a gate insulating film formed over said semiconductor layer;

a first gate electrode comprising a first conductive film formed over said gate insulating film;

a second gate electrode comprising a second conductive film formed over said first gate electrode;

wherein the width of said first conductive film in the longitudinal direction of said channel forming region is larger than that of said second conductive film;

wherein said LDD region entirely overlaps with said first conductive film with said gate insulating film interposed therebetween and contacts said source and drain regions, and

wherein said channel forming region overlaps with said second conductive film with said gate insulating film interposed therebetween.

3. (Currently Amended) Electronic equipment comprising:

a semiconductor layer formed on an insulating surface, said semiconductor layer having a channel forming region, an LDD region and source and drain regions;

a gate insulating film formed over said semiconductor layer;

a first gate electrode comprising a first conductive film formed over said gate insulating film, said first conductive film having a tapered shape in cross section at an edge portion;

a second gate electrode comprising a second conductive film formed over said first gate electrode;

wherein the width of said first conductive film in the longitudinal direction of said channel forming region is larger than that of said second conductive film;

wherein said LDD region entirely overlaps with said first conductive film with said gate insulating film interposed therebetween and contacts said source and drain regions, [[and]]

wherein said channel forming region overlaps with said second conductive film with said gate insulating film interposed therebetween, and

wherein the gate insulating film has a first thickness in a region where the gate insulating film is covered by the first gate electrode and a second thickness in a region where the gate insulating film is not covered by the first gate electrode, and the second thickness is thinner than the first thickness.

4. (Previously Presented) The electronic equipment according to claim 1, wherein said LDD region is formed in a self-aligning manner in accordance with the addition of an impurity element into said semiconductor layer with said second conductive film as a mask.

5. (Previously Presented) The electronic equipment according to claim 2, wherein said LDD region is formed in a self-aligning manner in accordance with the addition of an impurity element into said semiconductor layer with said second conductive film as a mask.

6. (Previously Presented) The electronic equipment according to claim 3, wherein said LDD region is formed in a self-aligning manner in accordance with the addition of an impurity element into said semiconductor layer with said second conductive film as a mask.

7. (Previously Presented) The electronic equipment according to claim 4, wherein said LDD region contains a region having a concentration of said impurity element gradient in a range from at least 1×10^{17} to 1×10^{18} atoms/cm³, while increasing as the distance from said channel forming region increasing.

8. (Previously Presented) The electronic equipment according to claim 5, wherein said LDD region contains a region having a concentration of said impurity element gradient in a range from at least 1×10^{17} to 1×10^{18} atoms/cm³, while increasing as the distance from said channel forming region increasing.

9. (Previously Presented) The electronic equipment according to claim 6, wherein said LDD region contains a region having a concentration of said impurity element gradient in a range from at least 1×10^{17} to 1×10^{18} atoms/cm³, while increasing as the distance from said channel forming region increasing.

10. (Withdrawn) Electronic equipment comprising:

a pixel TFT and a driver circuit TFT, each having a semiconductor layer formed on an insulating surface, a gate insulating film formed over said semiconductor layer, a first gate electrode comprising a first conductive film formed over said gate insulating film, and a second gate electrode comprising a second conductive film formed over said first gate electrode;

wherein said semiconductor layer of said pixel TFT comprises:

a channel forming region overlapping with said second conductive film with said gate insulating film interposed therebetween;

a first LDD region contacting said channel forming region and overlapping with said first conductive film with said gate insulating film interposed therebetween;

a second LDD region contacting said first LDD region;

a source region and a drain region contacting said second LDD region, and wherein said semiconductor layer of said driver circuit TFT comprises:

a channel forming region overlapping with said second conductive film with said gate insulating film interposed therebetween;

a third LDD region contacting said channel forming region and overlapping with said first conductive film with said gate insulating film interposed therebetween;

a source region and a drain region contacting said third LDD region, and

wherein the width of said first conductive film in the longitudinal direction of the channel forming region is larger than that of said second conductive film.

11. (Previously Presented) Electronic equipment comprising:

a pixel TFT and a driver circuit TFT, each having a semiconductor layer formed on an insulating surface, a gate insulating film formed over said semiconductor layer, a first gate electrode comprising a first conductive film formed over said gate insulating film, and a second gate electrode comprising a second conductive film formed over said first gate electrode;

wherein said semiconductor layer of said pixel TFT comprises:

a channel forming region overlapping with said second conductive film with said gate insulating film interposed therebetween;

a first LDD region contacting said channel forming region and overlapping with said first conductive film with said gate insulating film interposed therebetween;

a second LDD region contacting said first LDD region;

a source region and a drain region contacting said second LDD region, and

wherein said semiconductor layer of said driver circuit TFT comprises:

a channel forming region overlapping with said second conductive film with said gate insulating film interposed therebetween;

a third LDD region contacting said channel forming region and entirely overlapping with said first conductive film with said gate insulating film interposed therebetween;

a source region and a drain region contacting said third LDD region, and

wherein said first conductive film has a tapered shape in cross section at an edge portion,

and

wherein the width of said first conductive film in the longitudinal direction of the channel forming region is larger than that of said second conductive film.

12. (Withdrawn) The electronic equipment according to claim 10, wherein said first or third LDD region contains a region having a concentration of said impurity element gradient in a range from at least 1×10^{17} to 1×10^{18} atoms/cm³, while increasing as the distance from said channel forming region increasing.

13. (Previously Presented) The electronic equipment according to claim 11, wherein said first or third LDD region contains a region having a concentration of said impurity element gradient in a range from at least 1×10^{17} to 1×10^{18} atoms/cm³, while increasing as the distance from said channel forming region increasing.

14. (Withdrawn) The electronic equipment according to claim 12, wherein said first or third LDD region contains a region having a concentration of said impurity element gradient in a

range from at least 1×10^{17} to 1×10^{18} atoms/cm³, while increasing as the distance from said channel forming region increasing.

15. (Previously Presented) The electronic equipment according to claim 11, wherein said first or third LDD region contains a region having a concentration of said impurity element gradient in a range from at least 1×10^{17} to 1×10^{18} atoms/cm³, while increasing as the distance from said channel forming region increasing.

16. (Withdrawn) Electronic equipment comprising:

a semiconductor layer formed on an insulating surface, said semiconductor layer having a channel forming region, an LDD region contacting said channel forming region, and a source region and a drain region contacting said LDD region;

a gate insulating film formed over said semiconductor layer;

a first gate electrode comprising a first conductive film over said gate insulating film;

a first wiring formed over said gate insulating film;

a second gate electrode comprising a second conductive film over said first gate electrode;

a second wiring formed over said first wiring;

a first interlayer insulating film formed over said first gate electrode, said first wiring, said second gate electrode and said second wiring;

a second interlayer insulating film formed over said first interlayer insulating film;

an intermediate wiring formed over said second interlayer insulating film and in contact with said first interlayer insulating film through a contact hole formed in said second interlayer insulating film;

wherein the width of said first conductive film in the longitudinal direction of said channel forming region is larger than that of the second conductive film;

wherein said channel forming region overlaps with said second conductive film with said gate insulating film interposed therebetween;

wherein said LDD region overlaps with said first conductive film with said gate insulating film interposed therebetween, and

wherein said intermediate wiring overlaps with said second wiring with said first interlayer insulating film interposed therebetween in said contact hole.

17. (Withdrawn) Electronic equipment comprising:

a semiconductor layer formed on an insulating surface, said semiconductor layer having a channel forming region, an LDD region contacting said channel forming region, and a source region and a drain region contacting said LDD region;

a gate insulating film formed over said semiconductor layer;

a first gate electrode comprising a first conductive film over said gate insulating film;

a first wiring formed over said gate insulating film;

a second gate electrode comprising a second conductive film over said first gate electrode;

a second wiring formed over said first wiring;

a first interlayer insulating film formed over said first gate electrode, said first wiring, said second gate electrode and said second wiring;

a second interlayer insulating film formed over said first interlayer insulating film;

an intermediate wiring formed over said second interlayer insulating film and in contact with said first interlayer insulating film through a first contact hole formed in said second interlayer insulating film;

wherein said channel forming region overlaps with said second conductive film with said gate insulating film interposed therebetween;

wherein said LDD region overlaps with said first conductive film with said gate insulating film interposed therebetween;

wherein said intermediate wiring overlaps with said second wiring with said first interlayer insulating film interposed therebetween in said first contact hole, and

wherein said intermediate wiring is connected to said source region or said drain region through a second contact hole formed in said gate insulating film, said first interlayer insulating film and said second interlayer insulating film.

18. (Withdrawn) Electronic equipment comprising:

a semiconductor layer formed on an insulating surface, said semiconductor layer having a channel forming region, an LDD region contacting said channel forming region, and a source region and a drain region contacting said LDD region;

a gate insulating film formed over said semiconductor layer;

a first gate electrode comprising a first conductive film over said gate insulating film;

a first wiring formed over said gate insulating film;

a second gate electrode comprising a second conductive film over said first gate electrode;

a second wiring formed over said first wiring;

a first interlayer insulating film formed over said first gate electrode, said first wiring, said second gate electrode and said second wiring;

a second interlayer insulating film formed over said first interlayer insulating film;

an intermediate wiring formed over said second interlayer insulating film and in contact with said first interlayer insulating film through a contact hole formed in said second interlayer insulating film;

a shielding film formed over said second interlayer insulating film, said shielding film made from the same material as said intermediate wiring;

wherein said channel forming region overlaps with said second conductive film with said gate insulating film interposed therebetween;

wherein said LDD region overlaps with said first conductive film with said gate insulating film interposed therebetween;

wherein said intermediate wiring overlaps with said second wiring with said first interlayer insulating film interposed therebetween in said contact hole, and

wherein said shielding film overlaps with the channel forming region.

19. (Withdrawn) Electronic equipment comprising:

a semiconductor layer formed on an insulating surface, said semiconductor layer having a channel forming region, an LDD region contacting said channel forming region, and a source region and a drain region contacting said LDD region;

a gate insulating film formed over said semiconductor layer;

a first gate electrode comprising a first conductive film over said gate insulating film;

a first wiring formed over said gate insulating film;

a second gate electrode comprising a second conductive film over said first gate electrode;

a second wiring formed over said first wiring;

a first interlayer insulating film formed over said first gate electrode, said first wiring, said second gate electrode and said second wiring;

a second interlayer insulating film formed over said first interlayer insulating film;

an intermediate wiring formed over said second interlayer insulating film and in contact with said first interlayer insulating film through a first contact hole formed in said second interlayer insulating film;

a shielding film formed over said second interlayer insulating film, said shielding film made from the same material as said intermediate wiring;

wherein said channel forming region overlaps with said second conductive film with said gate insulating film interposed therebetween;

wherein said LDD region overlaps with said first conductive film with said gate insulating film interposed therebetween;

wherein said intermediate wiring overlaps with said second wiring with said first interlayer insulating film interposed therebetween in said first contact hole;

wherein said shielding film overlaps with the channel forming region, and

wherein said intermediate wiring is connected to said source region or said drain region through a second contact hole formed in said gate insulating film, said first interlayer insulating film and said second interlayer insulating film.

20. (Withdrawn) Electronic equipment comprising:

a shielding film formed over a substrate;

an insulating film formed over said shielding film;

a semiconductor layer formed on said insulating film, said semiconductor layer having a channel forming region, an LDD region contacting said channel forming region, and a source region and a drain region contacting said LDD region;

a gate insulating film formed over said semiconductor layer;

a first gate electrode comprising a first conductive film formed over said gate insulating film;

a second gate electrode comprising a second conductive film formed over said first gate electrode;

wherein said channel forming region overlaps with said second conductive film with said gate insulating film interposed therebetween;

wherein said LDD region overlaps with said first conductive film with said gate insulating film interposed therebetween, and

wherein said shielding film overlaps with said channel forming region with said insulating film interposed therebetween.

21. (Withdrawn) The electronic equipment according to claim 20, wherein said insulating film is leveled in accordance with CMP polishing.

22. (Canceled).

23. (Withdrawn) A method of manufacturing electronic equipment comprising the steps of:

- forming a semiconductor layer on an insulating surface;
- forming a gate insulating film over said semiconductor layer;
- forming a first conductive film over said gate insulating film;
- forming a second conductive film over said first conductive film;
- patterning said first conductive film and said second conductive film to a first gate electrode and a second gate electrode;
- introducing a first impurity element to said semiconductor layer;
- forming a mask over said semiconductor layer so as to cover said first gate electrode and said second gate electrode;
- introducing a second impurity element having the same conductivity type as said first impurity element into said semiconductor layer in order to form a channel forming region, a first LDD region contacting said channel forming region, a second LDD region contacting said first LDD region, and a source region and a drain region contacting said second LDD region;
- forming an interlayer insulating film over said semiconductor layer, said first gate electrode, and said second gate electrode;
- forming a contact hole in said interlayer insulating film; and
- forming a pixel electrode electrically connected to said source region or said drain region through said contact hole,
- wherein the width of said first gate electrode is larger than that of second gate electrode in the longitudinal direction of said channel forming region;
- wherein said channel forming region overlaps with said second gate electrode with gate insulating film interposed therebetween; and
- wherein said first LDD region overlaps with said first gate electrode with said gate insulating film interposed therebetween.

24. (Withdrawn) A method of manufacturing electronic equipment comprising the steps of:

- forming a semiconductor layer on an insulating surface;
- forming a gate insulating film over said semiconductor layer;
- forming a first conductive layer over said gate insulating film, and a second conductive layer over said first conductive layer;
- etching said first conductive layer and said second conductive layer to form a first gate electrode having a tapered portion and a second gate electrode having a tapered portion;
- introducing an impurity element imparting one conductivity type into said semiconductor layer to form a first LDD region and a second LDD region;
- introducing an impurity element imparting one conductivity type into said semiconductor film to form a source region and a drain region;
- forming an interlayer insulating film over said semiconductor layer, said first gate electrode and said second gate electrode;
- forming a contact hole in said interlayer insulating film; and
- forming a pixel electrode electrically connected to said source region or said drain region through said contact hole.

25. (Withdrawn) A method of manufacturing electronic equipment comprising the steps of:

- forming a semiconductor layer on an insulating surface;
- forming a gate insulating film over said semiconductor layer;
- forming a first conductive film over said gate insulating film;
- forming a second conductive film over said first conductive film;
- etching said second conductive film to form a first shape second conductive layer;
- etching said first conductive film to form a first shape first conductive layer;

etching said first shape first conductive layer and the first shape second conductive layer to form a first gate electrode having a tapered portion and a second gate electrode having a tapered portion respectively;

introducing an impurity element imparting one conductivity type into said semiconductor layer to form a first LDD region and a second LDD region;

introducing an impurity element imparting one conductivity type into said semiconductor layer to form a source region or a drain region;

forming an interlayer insulating film over said semiconductor layer, said first gate electrode and said second gate electrode;

forming a contact hole in said interlayer insulating film; and

forming a pixel electrode electrically connected to said source region or said drain region through said contact hole.

26. (Previously Presented) The electronic equipment according to claim 1 wherein said electronic equipment is selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a game apparatus, a car navigation system, a personal computer and a portable information terminal.

27. (Previously Presented) The electronic equipment according to claim 2 wherein said electronic equipment is selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a game apparatus, a car navigation system, a personal computer and a portable information terminal.

28. (Previously Presented) The electronic equipment according to claim 3 wherein said electronic equipment is selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a game apparatus, a car navigation system, a personal computer and a portable information terminal.

29. (Withdrawn) The electronic equipment according to claim 10 wherein said electronic equipment is selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a game apparatus, a car navigation system, a personal computer and a portable information terminal.

30. (Previously Presented) The electronic equipment according to claim 11 wherein said electronic equipment is selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a game apparatus, a car navigation system, a personal computer and a portable information terminal.

31. (Withdrawn) The electronic equipment according to claim 16 wherein said electronic equipment is selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a game apparatus, a car navigation system, a personal computer and a portable information terminal.

32. (Withdrawn) The electronic equipment according to claim 17 wherein said electronic equipment is selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a game apparatus, a car navigation system, a personal computer and a portable information terminal.

33. (Withdrawn) The electronic equipment according to claim 18 wherein said electronic equipment is selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a game apparatus, a car navigation system, a personal computer and a portable information terminal.

34. (Withdrawn) The electronic equipment according to claim 19 wherein said electronic equipment is selected from the group consisting of a video camera, a digital camera, a projector,

a head mounted display, a game apparatus, a car navigation system, a personal computer and a portable information terminal.

35. (Withdrawn) The electronic equipment according to claim 20 wherein said electronic equipment is selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a game apparatus, a car navigation system, a personal computer and a portable information terminal.

36. (New) The electronic equipment according to claim 1, further comprising an interlayer insulating film over the first and the second gate electrode,
wherein the interlayer insulating film comprises an organic insulating material.

37. (New) The electronic equipment according to claim 2, further comprising an interlayer insulating film over the first and the second gate electrode,
wherein the interlayer insulating film comprises an organic insulating material.

38. (New) The electronic equipment according to claim 3, further comprising an interlayer insulating film over the first and the second gate electrode,
wherein the interlayer insulating film comprises an organic insulating material.